Elasticity of Single Crystal MgO from Simultaneous X-ray and Ultrasonic Measurements to 9 GPa and 1500 K in a Multi-Anvil Apparatus	X17B1

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The equation-of-state of MgO is of importance in understanding the seismic profiles of the lower mantle and in applications to in situ pressure standards in high temperature-pressure experiments. In our laboratory, we have developed techniques to enable precise ultrasonic interferometeric measurements of wave velocities in minerals to be performed to pressures of 9 GPa and temperatures of 1500 K using a DIA-type, cubic-anvil apparatus (SAM 85) installed on the superconducting wiggler beamline (X17B) at the National Synchrotron Light Source of the Brookhaven National Laboratory. X-ray spectra of both the polycrystalline specimen and the NaCl medium which surrounds it are monitored continuously; the former provides PVT data to compliment the velocity measurements and the latter the pressure standard. We have obtained new data on single-crystal MgO to simultaneous pressures of 7 GPa and temperatures of 1500 K, and compare these new data to the acoustic measurements of Spetzler (1970) to 0.8 GPa and 800 K using a specially-designed pressure-temperature path (see figure).

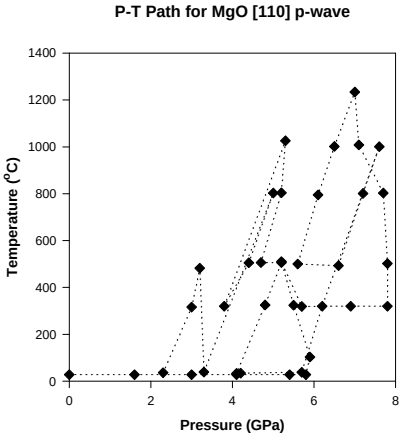

Figure 1. P-T Path of Ultrasonic Experiment